

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicant:	Alan F. Benner	:	Group Art Unit:	2874
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For: METHOD AND APPARATUS FOR PROVIDING OPTOELECTRONIC
COMMUNICATION WITH AN ELECTRONIC DEVICE

June 8, 2006

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT UNDER 37 CFR 1.111

Sir:

This is in response under 37 CFR §1.111 to the Office Action dated March 8, 2006 issued in the above-identified application, wherein Applicant requests reconsideration and entry in view of the following amendment and remarks.

Amendments to the Claims begin on page 2.

Remarks/Arguments begin on page 7.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) An optoelectronic assembly for a computer system, comprising:

an electronic chip set;

a printed circuit board;

a substrate disposed between the electronic chip set and the printed circuit board, the substrate comprising a first major surface opposing a second major surface, wherein the first major surface is in communication with the electronic chip set[[:]], and wherein the second major surface is in electrical communication with the printed circuit board;

an electrical signaling medium having a first end in signal communication with the substrate;

an optoelectronic transducer in signal communication with a second end of the electrical signaling medium; and

an optical coupling guide for aligning an optical signaling medium with the optoelectronic transducer;

wherein an electrical signal from the electronic chip set is communicated to the optoelectronic transducer via the substrate and the electrical signaling medium, and

wherein the electronic chip set and the optoelectronic transducer share a common thermal path for cooling;

a heat spreader having a first and second surface, the first surface in thermal contact with the electronic chip set and adapted to provide unimpeded heat flow, and the second surface in thermal contact with the optoelectronic transducer, the first surface

being orthogonal to the second surface, the optoelectronic transducer being mounted on the second surface.

2. (Canceled)

3. (Original) The assembly of Claim 1, wherein:

the electronic chip set comprises a processor chip, a memory chip a signal processing chip, a switching chip, or any combination thereof; and

the substrate comprises a multi-chip module, a dual-chip module, a single-chip module, or any combination thereof.

4. (Original) The assembly of Claim 1, wherein the substrate is an organic or a ceramic substrate containing electrical interconnects.

5. (Currently Amended) The assembly of Claim 1, wherein:

the electrical signaling medium is a flexible printed circuit board; and

the substrate comprises ~~a first major surface in communication with the electronic chip set, a second major surface opposing the first surface, and an edge surface disposed~~ between the first and second major surfaces.

6. (Original) The assembly of Claim 1, wherein the optoelectronic transducer comprises:

an integrated circuit in communication with the second end of the electrical signaling medium; and

a laser, a vertical cavity surface emitting laser, a light emitting diode, a photodiode, or other light emitting or photosensitive device array, in electrical communication with the integrated circuit.

7. (Original) The assembly of Claim 1, wherein the optical coupling guide is a set of alignment pins.

8. (Original) The assembly of Claim 5, wherein the first end of the flexible printed circuit board is in communication with the first major surface of the substrate.

9. (Original) The assembly of Claim 5, wherein the first end of the flexible printed circuit board is in communication with the second major surface of the substrate.

10. (Original) The assembly of Claim 5, wherein the first end of the flexible printed circuit board is in communication with the edge surface of the substrate.

11. (Currently Amended) An optoelectronic assembly for a computer system, comprising:

an electronic chip set adapted for at least one of data processing, data switching, and data storage;

a substrate comprising a first major surface in electrical communication with the electronic chip set,[[;]] a second major surface opposing the first surface, and an edge surface disposed between the first and second surfaces;

an electrical signaling medium having a first end in signal communication with the substrate;

an optoelectronic transducer in signal communication with a second end of the electrical signaling medium; and

an optical coupling guide for aligning an optical signaling medium with the optoelectronic transducer;

a printed circuit board in communication with the second major surface of the substrate;

wherein an electrical signal from the electronic chip set is communicated to the optoelectronic transducer via the substrate and the electrical signaling medium, and

wherein the electronic chip set and the optoelectronic transducer share a common thermal path for cooling,

wherein the electrical signaling medium is a flexible printed circuit board; ~~and the substrate comprises a first major surface in communication with the electronic chip set, a second major surface opposing the first surface, and an edge surface disposed between the first and second surfaces;~~

wherein the flexible printed circuit board is absent electrical signal interconnections except for electrical signal interconnections between the substrate and the optoelectronic transducer.

12. (Original) The assembly of Claim 9, wherein:

the second major surface of the substrate includes a shelf or recess; and

the first end of the flexible printed circuit board is in communication with the substrate at the shelf or recess.

13. (Previously Presented) The assembly of Claim 1, further comprising a second optoelectronic transducer in thermal contact with the second surface of the thermal spreader, the first and second optoelectronic transducers being offset from one another in at least one of a vertical direction and a horizontal direction.

14. (Original) The assembly of Claim 3 wherein the electronic chip set comprises signal multiplexing and coding functions for driving an e/o device directly, and functions for receiving a signal directly from an o/e device.

15. – 19. (Canceled)

20. (Currently Amended) The assembly of Claim 1, further comprising:

at least a second optoelectronic transducer in thermal contact with the second surface of the thermal spreader, the first and at least a second optoelectronic transducers

being offset from each other in ~~at least one of~~ both a vertical direction and a horizontal direction, thereby improving packing density of the optoelectronic transducers on the thermal spreader.

21. (Previously Presented) The assembly of Claim 1 wherein the optical coupling guide is mounted on the second surface.

REMARKS / ARGUMENTS

Status of Claims

Claims 1, 3-14, and 20-21 are pending in the application. Claims 1, 3-14, and 20-21 stand rejected. Claim is objected to for insufficient antecedent basis in the claim. Applicant has amended Claims 1, 5, 11 and 20, leaving Claims 1, 3-14, and 20-21 for consideration upon entry of the present Amendment.

Applicant respectfully submits that the rejections under 35 U.S.C. §102(a) and 35 U.S.C. §103(a) have been traversed, that no new matter has been entered, and that the application is in condition for allowance.

Claim Objections

Claim 11 is objected to for insufficient antecedent basis in the claim for “the second major surface” in line 12. The claim has been amended to properly address the antecedent basis.

Accordingly, Applicant respectfully submits that the objection of claim informality has been corrected, and requests reconsideration and withdraw of this objection.

Rejections Under 35 U.S.C. §102(a)

Claims 1, 5-11, and 21 stand rejected under 35 U.S.C. §102(a) as being anticipated by Stricot et al (U.S. Patent No. 6,767,142, hereinafter Stricot).

Applicant traverses this rejection for the following reasons.

Applicant respectfully submits that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, *in a single prior art reference.*” *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). Moreover, “[t]he identical invention must be shown in as complete detail as is contained in the *** claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir.

1989). Furthermore, the single source must disclose all of the claimed elements “arranged as in the claim.” *Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 716, 223 U.S.P.Q. 1264, 1271 (Fed. Cir. 1984). Missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another reference. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 780, 227 U.S.P.Q. 773, 777 (Fed. Cir. 1985).

Regarding Independent Claims 1 and 11

Applicant has amended Claim 1 to now recite, inter alia,

“...a printed circuit board;

a substrate disposed between the electronic chip set and the printed circuit board, the substrate comprising ***a first major surface opposing a second major surface***, wherein ***the first major surface is in communication with the electronic chip set***, and wherein ***the second major surface is in electrical communication with the printed circuit board...***”.

Applicant has amended Claim 11 to now recite, inter alia,

“...a substrate comprising ***a first major surface in electrical communication with the electronic chip set, a second major surface opposing the first surface***, and an edge surface disposed between the first and second surfaces...

a printed circuit board in communication with the second major surface of the substrate ...”.

No new matter has been added by these amendments as antecedent support may be found in the specification as originally filed, such as at Paragraph [0014], Figures 1-3, and Claim 5, for example.

Dependent claims inherit all of the limitations of the respective parent claim.

In alleging anticipation, the Examiner remarks “Stricot et al disclose an optoelectronic assembly comprising an electronic chip set (35); a substrate (32) comprising a first major surface (top surface) in communication with the electronic chip set, a second major surface (bottom surface) and an edge surface (the surface where the flexible circuit [33] is connected...)” (Paper 030406, page 2).

Applicant submits that Stricot discloses “Printed circuit 2 also has a second printed-circuit element 32. Second element 32 is connected to first element 13 by means of a segment of flexible printed circuit 33 ... correct placement of printed circuit 2 on heatsink 4 is assured. In fact, there is a preferred position for segment 13 relative to first face 25 and of *second element 32 relative to second face 27* [of the heatsink]” (emphasis and clarification added). (Stricot, col. 4 lines 45- 47 and col. 5 lines 28 –31).

Here, Applicant finds Stricot to disclose a second printed-circuit element 32 to be edgewise connected to first element 13 by means of a segment of flexible printed circuit 33, and not to be surface-wise connected *via an opposing surface* as claimed.

More specifically, Applicant submits that Stricot is absent the now claimed “a substrate disposed between the electronic chip set and the printed circuit board, the substrate comprising *a first major surface opposing a second major surface*, wherein *the first major surface is in communication with the electronic chip set*, and wherein *the second major surface is in electrical communication with the printed circuit board...*” as claimed for in Claim 1, and “...a substrate comprising *a first major surface in electrical communication with the electronic chip set, a second major surface opposing the first surface*, and ... *a printed circuit board in communication with the second major surface* of the substrate...” as claimed for in Claim 11.

Accordingly, Applicant submits that Stricot does not disclose each and every element of the claimed invention arranged as in the claim, and absent anticipatory disclosure in Stricot of each and every element of the claimed invention arranged as in the claim, Stricot cannot be anticipatory.

Regarding Claims 5 and 10 More Specifically

The Examiner alleges anticipation by remarking “Stricot et al’s entire substrate including the first, second and the edge surface is in communication with the flexible printed circuit board.” Paper No. 030406, page 3.

However, the Examiner does not state with specificity where Stricot discloses each and every element of Claims 5 and 10 arranged as claimed.

Claim 5 recites:

“The assembly of Claim 1, wherein:
the electrical signaling medium is a flexible printed circuit board; and
the substrate comprises an edge surface disposed between the first and second
major surfaces.”

Claim 10 recites:

“The assembly of Claim 5, wherein the first end of the flexible printed circuit
board is in communication with the edge surface of the substrate.”

Here, Applicant claims a specific relationship between the flexible printed circuit
board and the edge surface of the substrate, which is disposed between first and second
major surfaces of the substrate that are themselves arranged for specific signal
communication with the chip set and printed circuit board, as claimed.

By broadly alleging anticipation without stating with specificity where each and
every element of the claimed invention arranged as claimed may be found, Applicant
submits that the Examiner has failed to establish a prima facie case of anticipation.

In view of the foregoing amendments and remarks, Applicant submits that Stricot
does not disclose each and every element of the claimed invention arranged as claimed
and therefore cannot be anticipatory. Accordingly, Applicant respectfully submits that
the Examiner’s rejection under 35 U.S.C. §102(a) has been traversed, and requests that
the Examiner reconsider and withdraw this rejection.

Rejections Under 35 U.S.C. §103(a)

Examiner’s Paragraph 6: Claims 3, 4, 12, 13 and 20 stand rejected under 35
U.S.C. §103(a) as being unpatentable over Stricot.

Examiner’s Paragraph 7: Claim 11 stands rejected under 35 U.S.C. §103(a) as
being unpatentable over Hudgins et al (U.S. Patent 6,270,262 B1, hereinafter Hudgins)
and further in view of Giboney et al (U.S. Patent 6,318,909 B1, hereinafter Giboney).

Applicant traverses these rejections for the following reasons.

Applicant respectfully submits that the obviousness rejection based on the References is improper as the References fail to teach or suggest each and every element of the instant invention arranged in such a manner as to perform as the claimed invention performs. For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). The Examiner must meet the burden of establishing that all elements of the invention are taught or suggested in the prior art. MPEP §2143.03.

Regarding Examiner's Paragraph 6

Claims 3, 4, 12, 13 and 20 all depend from Claim 1.

Dependent claims inherit all of the limitations of the respective parent claim and any intervening claim.

In view of the amendments and remarks set forth above regarding the allowability of Claim 1, Applicant submits that Claims 3, 4, 12, 13 and 20 are now allowable as being dependent upon an allowable claim.

Regarding Claim 20 More Specifically

Applicant has amended Claim 20 to now recite, inter alia:

“...the first and at least a second optoelectronic transducers being offset from each other in both a vertical direction and a horizontal direction, thereby improving packing density of the optoelectronic transducers on the thermal spreader.”

No new matter has been added as antecedent support may be found in the application as originally filed, such as at Paragraph [0019], for example.

In alleging obviousness, the Examiner remarks “...placing other components such as additional optoelectronic transducer on the second surface of the thermal spreader would have been obvious to one of ordinary skill in the art for the purpose of processing optical signals.” Paper 030406, pages 4-5.

Applicant respectfully disagrees that Stricot teaches each and every element of the claimed invention arranged to perform as the claimed invention performs, as Applicant finds not teaching in Stricot of improving the packing density of multiple optoelectronic

transducers on a thermal spreader. Accordingly, Applicant submits that a prima facie case of obviousness cannot be established.

Regarding Examiner's Paragraph 7 Directed to Claim 11

The Examiner acknowledges that Hudgins does not specifically disclose the use of an optical coupling guide and looks to Giboney to cure this deficiency.

In alleging obviousness, the Examiner asserts that Hudgins discloses "...an electronic chip set (46); a substrate (30b) in communication with the electronic chip set...a printed circuit board (30a) in communication with a second major surface of the substrate..." (Paper 030406, page 5).

The Applicant respectfully disagrees.

In comparing Hudgins with the claimed invention, Applicant finds Hudgins to teach "As further illustrated in FIGS. 2 and 3, each optical interconnect module 16 includes a pair of rectangular configured printed wiring circuit boards 30a, 30b, which are spaced in close proximity to each other. Each printed wiring circuit board 30a, 30b includes *an outer circuit carrying face 32* such that an *inner plenum 34 is defined between the inside surfaces 26 [sic (36)]* of the boards... As shown in FIGS. 2 and 3, a *plurality of electronic components 46 are mounted on the outer circuit carrying faces. A cooling core is also mounted within the plenum 34 and engages the circuit boards 30a, 30b* for cooling the electronic components mounted on the circuit boards as coolant is passed through the cooling core 50." (emphasis and correction added) (Hudgins, col. 4 lines 1-7, lines 24-29).

Here, Applicant submits that Hudgins teaches thermal communication between surfaces 36 of printed circuit boards 30a, 30b and cooling core 50, and does not teach or suggest the claimed electrical communication *via opposing surfaces* of a substrate. In fact, Applicant finds Hudgins to be absent a teaching of electrical communication between printed circuit board 30a and printed circuit board 30b (alleged by the Examiner to be the claimed substrate) *via opposing surfaces* or otherwise, and submits that the Examiner has not shown with specificity where such a teaching is provided by Hudgins.

Applicant more specifically submits that Hudgins is absent the claimed "...a substrate comprising *a first major surface in electrical communication with the electronic chip set, a second major surface opposing the first surface*, and ... *a printed circuit board in communication with the second major surface* of the substrate..." as claimed in Claim 11.

Furthermore, Applicant submits that Giboney fails to cure this deficiency of Hudgins.

Accordingly, Applicant respectfully submits that the combination of Hudgins and Giboney fails to teach or suggest each and every element of the claimed invention arranged in such a manner as to perform as the claimed invention performs, and therefore cannot properly be used to establish a prima facie case of obviousness.

In view of the foregoing, Applicant submits that the References fail to teach or suggest each and every element of the claimed invention arranged to perform as the claimed invention performs, and are therefore wholly inadequate in their teaching of the claimed invention as a whole, fail to offer any reasonable expectation of success in combining the References to perform as the claimed invention performs, and discloses a substantially different invention from the claimed invention, and therefore cannot properly be used to establish a prima facie case of obviousness. Accordingly, Applicant respectfully requests reconsideration and withdrawal of all rejections under 35 U.S.C. §103(a), which Applicant considers to be traversed.

In light of the foregoing, Applicant respectfully submits that the Examiner's rejections under 35 U.S.C. §102(a) and 35 U.S.C. §103(a) have been traversed, and respectfully requests that the Examiner reconsider and withdraw these rejections.

The Commissioner is hereby authorized to charge any additional fees that may be required for this amendment, or credit any overpayment, to Deposit Account No. 09-0463.

In the event that an extension of time is required, or may be required in addition to that requested in a petition for extension of time, the Commissioner is requested to grant a petition for that extension of time that is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to the above-identified Deposit Account.

Respectfully submitted,

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